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**CONSERVATION RESOURCE ENERGY DATA**

**THE RED BOOK**

**BONNEVILLE**

Power Administration



# CONSERVATION RESOURCE ENERGY DATA (The RED Book)

## **PURPOSE:**

This document summarizes data on costs and savings pertaining to the Bonneville Power Administration's (BPA) energy conservation acquisition programs and resources. The document provides information and references for general audiences and use in preparing general publications.

## **IMPORTANT NOTE FOR THE USER:**

This information is sensitive to seemingly unimportant changes in the assumptions surrounding it. Use data with care to ensure that the correct characterizations of the monetary and energy figures are communicated together.

The RED Book information is presented to the nearest tenth of an average megawatt (aMW) in most of the tables. In the charts and graphs, the information is rounded to the nearest 5 aMW. When presenting this information to the public, however, we recommend using "rounded" numbers because we recognize that these data are not precise and are subject to adjustment over time. Prior to each support table, a narrative is provided.

This book contains data available through FY 2003 as reported by February 25, 2004. These data should be used as "official data" until an updated RED Book is published next year. Adjustments to the data will be captured annually in the RED Book as information from evaluations or other sources prove savings estimates should be increased or decreased.

If you have any questions about how to represent or use this information, please call Gene Ferguson at (503) 230-3608 or Roger Maddox at (509) 358-7454.

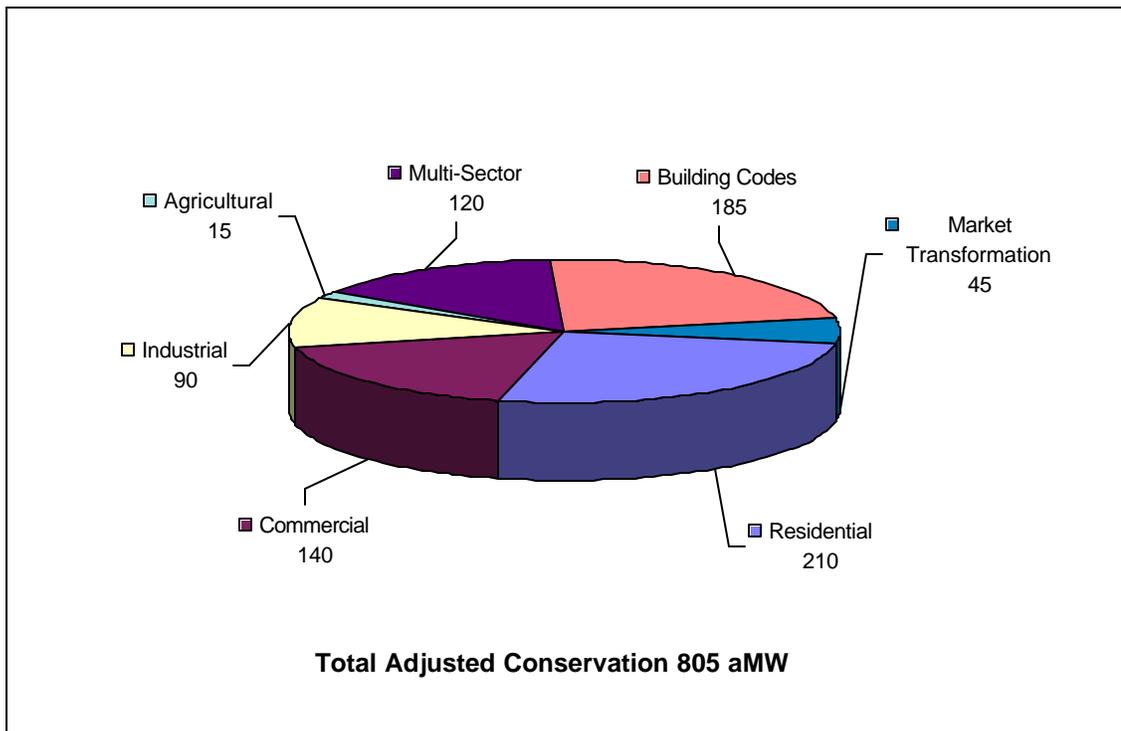
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## A Quick Overview (Figure 1)

Figure 1 presents a graphic comparison of BPA's historical (legacy and codes) savings (FY 1982-2003) and savings from current programs (Conservation Augmentation, Conservation and Renewables Discount, and Market Transformation). Figure 1 depicts savings for some specific market sectors and specific programs. Some savings reported in the cumulative totals have reached the accepted measure life for particular programs and projects. This RED Book includes an adjustment for certain savings or measures, such as Conservation Modernization (ConMod), where it has been deemed that the measure life has expired. Future editions of the RED Book will include additional adjustments to measures or programs where savings have also expired.

**FIGURE 1**  
**BPA'S HISTORICAL CONSERVATION SAVINGS**  
**FY 1982 - 2003**



Note: All numbers are rounded to the nearest 5 aMW. Previous RED Book versions of this graph contain ConMod Savings. We have removed that component from this version of the graph. The Region is no longer receiving conservation benefits from the aluminum industry due to the economical downturn of the industry.

# **HISTORICAL CONSERVATION SAVINGS**

## **BPA's Historical Conservation Savings by Sector**

(See Table A)

## **BPA's Historical Conservation Savings by Program**

(See Tables B1 and B2)

FY 1982 - 2003

### TOTAL CUMULATIVE SAVINGS:

BPA's total savings from 1982 – 2003 are approximately 925 aMWs. However, after the adjustments are made, the adjusted total accomplished savings are 804 aMWs. (The aMWs in the following paragraphs are rounded to the nearest 5 aMW.) Through direct conservation acquisition programs, BPA has acquired about 575 aMWs from FY 1982 - 2003. Almost two-thirds of these savings are in the residential and commercial sectors.

In addition to the direct acquisition of conservation, BPA has promoted the adoption of more energy-efficient building codes (residential and commercial) in Washington and Oregon, and has supported the adoption of residential and commercial Model Conservation Standards (MCS). BPA has also influenced the purchase of more energy efficient appliances, and other essential consumer life-style products and standards through Market Transformation activities. These codes and Market Transformation efforts have resulted in energy savings for BPA's service area of about 230 aMWs. This makes the adjusted total energy savings attributable to BPA's investments 805 aMWs through FY 2003.

### SECTOR SPECIFIC CUMULATIVE SAVINGS:

BPA's savings from direct acquisition programs from FY 1982 – 2003 resulted in 210 aMWs from the **residential** sector; 140 aMWs from the **commercial** sector; and 90 aMWs from the **industrial** sector. **Agricultural** sector savings are 15 aMWs. Since 1992, **multi-sector** programs, including Billing Credits, Competitive Acquisitions, BPA Transmission System Efficiency projects, Third Party Financing, and Flex Agreements, resulted in a total of 120 aMWs. Prior to the economic depression realized by the Aluminum Industry, **ConMod** saved 95 aMWs. The conservation savings for ConMod has been adjusted to 0 (zero). Load reductions from the adoption of more stringent **building codes** and **MCS** have resulted in 185 aMWs. **Market Transformation** contributed 45 aMWs for total adjusted energy savings from all activities of 805 aMWs through FY 2003.

## **NOTES ON TABLES A, B1 & B2:**

### ACHIEVED SAVINGS:

The reported average megawatt (aMW) savings are first year savings only and not the true measure life or program life savings. Measure life is an estimated average time a measure will remain in place, or whenever the structure in which the measure is installed ceases to exist.

### ADJUSTED SAVINGS:

The adjusted savings reflect, in some cases, the end of a measure life when BPA assumes the measures are no longer producing savings. In addition, the adjusted savings may reflect findings from evaluations that show savings are less than that expected when the program was initiated.

### LINE LOSS:

Reported savings include transmission and distribution line-loss credit savings of 7.5 percent for direct acquisition programs and 2.5 percent for ConMod. This adjustment is made to account for transmission and distribution line losses avoided through the acquisition of conservation.

During the transmission and distribution of electricity, a certain amount of electricity is lost due to electrical resistance inherent in conductors. Since conservation causes less electricity to be consumed by the end-uses, less electricity is transmitted and, therefore, less electricity is lost. BPA credits its conservation with the line-loss savings. This adjustment allows conservation and generation savings to be compared from the same point in the electrical system often referred to as the "bus bar."

### FUEL CHOICE:<sup>1</sup>

In 1993, BPA analyzed the following programs for possible fuel choice switching effects: Residential Weatherization, Manufactured Housing Acquisition Program (MAP), New Residential, Energy Smart Design (ESD), and Water Heating. These analyses concluded that the Residential Weatherization program had no fuel choice effect and only a modest effect on the Water Heating program.

However, a fuel choice effect was found in the New Residential sector, MAP, and the ESD program in the Commercial Sector. This analysis concluded that the 1993 new residential program incentives from Long Term Super Good Cents (LTSGC), Super Good Cents, Washington State Energy Code, and/or Northwest Energy Code, and the MAP program do affect fuel choice. The report states that the incentives paid to build energy efficient electrically heated homes throughout the region appear to be causing approximately 8 percent of the certified LTSGC homes and 6 percent of the new manufactured homes to be built using electricity when, absent the incentives, natural gas would have been the preferred fuel. The fuel choice impacts noted in the report is the result of builders responding to the available incentives from all the programs in their area.

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<sup>1</sup> Fuel choice effects occur when a consumer decides to change fuel sources from what would have been done absent the program. Of concern here is a decision to stay with electricity due to the increased efficiency when the consumer may have decided to use natural gas or another fuel instead.

In the Commercial Sector, a similar fuel choice impact was found in the Energy Smart Design program where analysis concluded that incentives did effect fuel choice decisions for HVAC equipment and water heating units. The incentives resulted in unintended fuel choice effects that accounted for 3 percent of the program savings occurring because the participants selected electricity instead of natural gas. The above fuel choice effects are incorporated in the program savings for Long Term Super Good Cents, Manufactured Housing Acquisition Program, and Energy Smart Design.

BUILDING CODES:

Building Code savings are a result of new building codes being passed in 1985 and MCS (or codes close to MCS) that were implemented in Washington in 1991, and in Oregon, Idaho, and Montana in 1992. Commercial MCS were implemented in Washington in 1994 and in Oregon in 1996. Savings from building codes and MCS are estimated through a backward-looking methodology in the load forecast and, therefore, are only approximate. The RED Book forecast of building code savings is based on medium load growth within the Region.

We no longer count Residential Code savings from 2003 forward since it is likely that codes would have reached current standards by now. In 2003, Idaho finally adopted a code equivalent to the 1988 MCS. Oregon and Washington codes have gone beyond MCS at this point, and current practice in Montana appears to be equivalent to the MCS. Although the national energy codes and international energy codes upon which Idaho codes were finally based may have been influenced by the MCS efforts in the Pacific Northwest, it appears that it is time to stop counting additional new benefits due to BPA's efforts in the 1980's and 1990's.

**TABLE A**  
**BPA's HISTORICAL CONSERVATION SAVINGS <sup>2</sup>**  
**(FY 1982 - 2003)**  
**Incremental aMW**

	FY 82-94	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	SubTotal FY 82-03	Adjustment FY 82-03	Total FY 82-03
Residential	172.6	3.4	1.4	0.6	0.7	0.6	0.3	6.4	19.5	9.8	215.3	(2.6)	212.7
Commercial	92.5	9.3	5.3	4.8	6.8	0.5	0.0	1.8	9.5	13.5	144.0	(6.7)	137.3
Industrial	53.4	18.2	11.8	6.7	0.2	0.2	0.0	0.4	2.3	3.5	96.7	(5.8)	90.9
Agricultural <sup>3</sup>	12.4	1.8	0.6	0.0	0.0	0.0	0.0	5.2	2.5	3.3	25.8	(10.0)	15.9
Multi-Sector	6.3	20.1	23.6	27.9	12.9	13.4	0.0	0.0	7.6	6.8	118.6	(0.2)	118.4
<b>Incremental Total</b>	<b>337.2</b>	<b>52.8</b>	<b>42.7</b>	<b>40.0</b>	<b>20.6</b>	<b>14.7</b>	<b>0.3</b>	<b>13.8</b>	<b>41.4</b>	<b>36.9</b>	<b>600.5</b>	<b>(25.3)</b>	<b>575.2</b>
Con/Mod	95.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	95.9	(95.9)	0.0
<b>Incremental Total with Con/Mod</b>	<b>433.1</b>	<b>52.8</b>	<b>42.7</b>	<b>40.0</b>	<b>20.6</b>	<b>14.7</b>	<b>0.3</b>	<b>13.8</b>	<b>41.4</b>	<b>36.9</b>	<b>696.4</b>	<b>(121.2)</b>	<b>575.2</b>
<b>Load Reductions from Improved Building Codes:</b>													
Residential	59.0	10.3	8.7	8.8	8.2	8.2	8.4	8.3	8.7	0.0	128.6	(0.0)	128.6
Commercial	10.8	4.6	5.9	6.5	4.9	6.2	4.5	4.1	4.3	4.2	56.0	(0.0)	56.0
<b>Incremental Total</b>	<b>69.8</b>	<b>14.9</b>	<b>14.6</b>	<b>15.3</b>	<b>13.1</b>	<b>14.4</b>	<b>12.9</b>	<b>12.4</b>	<b>13.0</b>	<b>4.2</b>	<b>184.6</b>	<b>(0.0)</b>	<b>184.6</b>
Market Transformation <sup>4</sup>	0.0	0.0	0.0	0.0	0.0	4.0	5.0	7.0	12.0	16.0	44.0	(0.0)	44.0
<b>Grand Total</b>	<b>502.9</b>	<b>67.7</b>	<b>57.3</b>	<b>55.3</b>	<b>33.7</b>	<b>33.1</b>	<b>18.2</b>	<b>33.2</b>	<b>66.4</b>	<b>57.1</b>	<b>925.0</b>	<b>(121.2)</b>	<b>803.8<sup>5</sup></b>

<sup>2</sup> Includes transmission line loss credit savings.

<sup>3</sup> The savings achieved related to irrigation scheduling is not included in the total column. These are one-year savings only and do not carry over to other years.

<sup>4</sup> Market Transformation includes only BPA's share and not regional market transformation savings.

<sup>5</sup> The numbers will not agree when added vertically and horizontally due to rounding effects and irrigation scheduling savings (see Footnote 3).

**TABLE B1**  
**BPA's HISTORICAL CONSERVATION SAVINGS**  
**BY PROGRAM (POST LEGACY) (FY 2000 - 2003)**  
**Incremental aMW As of February 17, 2004**

	FY 2000	FY 2001	FY 2002	FY 2003	Adjustment	TOTAL FY 00-03
<b>RESIDENTIAL</b>						
Low Income Residential Weatherization (States)	0.3	0.4	0.2	0.3	(0.0)	1.2
<i>Conservation Augmentation (ConAug)</i>						
CFL Program	0.0	1.8	4.6	0.0	(2.1)	4.3
IRLC	0.0	0.6	2.5	0.9	0.1	4.1
<b>TOTAL RESIDENTIAL CONAUG</b>	<b>0.0</b>	<b>2.4</b>	<b>7.1</b>	<b>0.9</b>	<b>(2.0)</b>	<b>8.4</b>
Conservation Renewable Discount (C&RD)	0.0	3.6	12.2	8.6	1.4	25.0
<b>RESIDENTIAL TOTAL</b>	<b>0.3</b>	<b>6.4</b>	<b>19.5</b>	<b>9.8</b>	<b>(2.6)</b>	<b>35.4</b>
<b>COMMERCIAL</b> <sup>6</sup>						
<i>Conservation Augmentation</i>						
Federal	0.0	0.8	2.7	2.1	(0.0)	5.6
LSO & ESO	0.0	0.2	2.3	2.5	(0.0)	5.0
Vending Miser	0.0	0.2	1.1	0.3	(0.1)	1.5
C&I	0.0	0.0	0.1	1.1	0.2	1.4
IRLC	0.0	0.0	1.2	3.5	0.3	5.0
<b>TOTAL COMMERCIAL CONAUG</b>	<b>0.0</b>	<b>1.2</b>	<b>7.4</b>	<b>9.5</b>	<b>0.4</b>	<b>18.5</b>
<i>Conservation Renewable Discount (C&amp;RD)</i>	<i>0.0</i>	<i>0.3</i>	<i>1.7</i>	<i>3.9</i>	<i>0.5</i>	<i>6.4</i>
<i>Federal Reimbursable</i>	<i>0.0</i>	<i>0.3</i>	<i>0.4</i>	<i>0.0</i>	<i>(0.0)</i>	<i>0.7</i>
<i>New Initiatives - Institutional Program</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>0.1</i>	<i>(0.0)</i>	<i>0.1</i>
<b>COMMERCIAL TOTAL</b>	<b>0.0</b>	<b>1.6</b>	<b>9.5</b>	<b>13.4</b>	<b>0.6</b>	<b>25.1</b>
<b>INDUSTRIAL</b>						
<i>Conservation Augmentation</i>						
Water/Wastewater	0.0	0.0	0.3	0.1	(0.0)	0.4
IRLC	0.0	0.0	1.1	1.5	(0.4)	2.2
<b>SUBTOTAL INDUSTRIAL CONAUG</b>	<b>0.0</b>	<b>0.0</b>	<b>1.4</b>	<b>1.6</b>	<b>(0.4)</b>	<b>2.6</b>
Conservation Renewable Discount (C&RD)	0.0	0.4	0.9	1.9	0.2	3.4
<b>INDUSTRIAL SUBTOTAL</b>	<b>0.0</b>	<b>0.4</b>	<b>2.3</b>	<b>3.5</b>	<b>(0.2)</b>	<b>6.0</b>
<b>Agricultural</b> <sup>7</sup>						
Conservation Augmentation	0.0	0.0	0.0	0.0	(0.0)	0.1
Conservation Renewable Discount (C&RD)	0.0	5.2	2.5	3.3	(10.0)	1.0
<b>AGRICULTURAL TOTAL</b>	<b>0.0</b>	<b>5.2</b>	<b>2.5</b>	<b>3.3</b>	<b>(10.0)</b>	<b>1.1</b>
<b>Multi-Sector</b>						
Conservation Augmentation	0.0	0.0	7.4	6.6	(0.2)	13.8
Conservation Renewable Discount (C&RD)	0.0	0.0	0.2	0.2	(0.0)	0.4
<b>MULTI-SECTOR SUBTOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>7.6</b>	<b>6.8</b>	<b>(0.2)</b>	<b>14.2</b>
<b>TOTAL CONSERVATION AUGMENTATION</b>	<b>0.0</b>	<b>3.6</b>	<b>23.7</b>	<b>18.6</b>	<b>(2.2)</b>	<b>43.7</b>
<b>TOTAL CONSERVATION RENEWABLE DISCOUNT (C&amp;RD)</b>	<b>0.0</b>	<b>7.8</b>	<b>16.5</b>	<b>16.1</b>	<b>(5.2)</b>	<b>30.0</b>
<b>BUILDING CODES</b>						
Residential	8.4	8.3	8.7	0.0	(0.0)	25.4
Commercial	4.5	4.1	4.3	4.2	(0.0)	17.1
<b>BUILDING CODES TOTAL</b>	<b>12.9</b>	<b>12.4</b>	<b>13.0</b>	<b>4.2</b>	<b>0.0</b>	<b>42.5</b>
<b>Market Transformation</b>	<b>5.0</b>	<b>7.0</b>	<b>12.0</b>	<b>16.0</b>	<b>(0.0)</b>	<b>40.0</b>
<b>TOTAL POST LEGACY CONSERVATION</b>	<b>18.2</b>	<b>32.9</b>	<b>66.4</b>	<b>57.0</b>	<b>(10.1)</b>	<b>164.8</b>

<sup>6</sup> The Commercial Legacy Program was deleted from this report due to savings inactivity post-1999

<sup>7</sup> For the Agricultural Sector, irrigation scheduling projects have a one-year life cycle. Therefore, 10.0 aMW has been adjusted in order to exclude it from the total column.

**TABLE B2**  
**BPA's HISTORICAL CONSERVATION SAVINGS**  
**BY PROGRAM (LEGACY)**  
**1982 - 1999**

	Incremental aMW																	TOTAL	
	FY 1982	FY 1983	FY 1984	FY 1985	FY 1986	FY 1987	FY 1988	FY 1989	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998		FY 1999
<b>RESIDENTIAL</b>																			
EXISTING:																			
Weatherization-SF&MF	6.9	33.1	10.6	9.0	9.2	4.7	4.6	3.1	2.6	3.0	4.6	4.7	3.3	1.4	0.0	0.0	0.0	0.0	100.8
Weatherization-MH	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2
Low-Income Wx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.3	0.4	0.6	1.8
NEW																			
Super Good Cents	0.0	0.0	0.0	0.0	0.1	0.3	0.4	0.8	1.0	1.2	0.7	0.3	0.0	0.0	0.0	0.0	0.0	0.0	4.8
New Manuf. Homes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.5	1.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	1.9
L/T Super Good Cents	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.8	0.9	0.5	0.4	0.2	0.2	0.0	3.2
Manuf. Hsg. Acq.(MAP)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	2.4	2.5	1.1	0.4	0.0	0.0	0.0	7.8
Water Heater Wraps	15.3	15.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.4
Shower Flow Restrictors	7.8	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.1
Waterheat/sh-hds/aerators	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.5	10.0	2.2	0.4	0.1	0.1	0.1	0.0	19.4
<b>RES. SUBTOTAL</b>	<b>30.0</b>	<b>49.5</b>	<b>10.6</b>	<b>9.02</b>	<b>9.3</b>	<b>5.0</b>	<b>5.0</b>	<b>4.0</b>	<b>3.7</b>	<b>4.7</b>	<b>14.4</b>	<b>18.4</b>	<b>9.0</b>	<b>3.4</b>	<b>1.4</b>	<b>0.6</b>	<b>0.7</b>	<b>0.6</b>	<b>179.4</b>
<b>COMMERCIAL</b>																			
LTNG. & WTR. HTNG.:																			
Water Heater Wraps	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0
Shower Flow Restrictors	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Lamps	0.1	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7
Street & Area Lighting	1.2	14.0	0.9	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.9
INSTITUTIONAL BLDG.																			
TAS's Tech Assist-Info.	0.0	0.0	1.4	2.3	2.2	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.6
ECM's	0.0	4.1	4.1	4.9	9.2	4.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.7
ACQUISITION SUPPORT																			
Purch. of Energy Svngs.	0.0	0.0	0.0	0.0	0.1	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3
Finance (CIPP)	0.0	0.0	0.0	0.0	0.1	0.6	0.9	0.6	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2
PSP&L	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6
PECI - Comm/Ind Ltng.	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
CREUS End-use Study	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Energy Smart Design	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	1.0	4.8	9.8	12.7	8.0	4.6	2.1	2.2	0.1	45.5
Targeted Acq. (TAP)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.6	1.3	0.5	0.5	2.7	4.6	0.4	11.7
ODOE - Schools	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.8	0.2	0.0	0.0	0.0	1.1
<b>COM. SUBTOTAL</b>	<b>2.5</b>	<b>20.8</b>	<b>6.4</b>	<b>8.04</b>	<b>12.4</b>	<b>8.0</b>	<b>1.0</b>	<b>0.9</b>	<b>1.03</b>	<b>1.0</b>	<b>4.9</b>	<b>11.4</b>	<b>14.1</b>	<b>9.3</b>	<b>5.3</b>	<b>4.8</b>	<b>6.8</b>	<b>0.5</b>	<b>119.2</b>

**TABLE B2 (continued)**  
**BPA's HISTORICAL CONSERVATION SAVINGS**  
**(FY 1982 - 1999)**

	FY 1982	FY 1983	FY 1984	FY 1985	FY 1986	FY 1987	FY 1988	FY 1989	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	TOTAL FY 82-99
<b>INDUSTRIAL</b>																			
Sponsor-Designed	0.0	0.0	0.0	0.0	0.4	0.9	4.3	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.7
Energy Savings Plan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	2.2	3.3	4.5	9.8	8.9	16.9	9.8	3.6	0.2	0.0	61.8
Major Plants	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	1.6	5.4	2.4	1.3	2.0	3.1	0.0	0.2	19.0
<b>IND. SUBTOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.4</b>	<b>0.9</b>	<b>4.3</b>	<b>6.7</b>	<b>2.2</b>	<b>6.3</b>	<b>6.1</b>	<b>15.2</b>	<b>11.3</b>	<b>18.2</b>	<b>11.8</b>	<b>6.7</b>	<b>0.2</b>	<b>0.2</b>	<b>90.5</b>
<b>AGRICULTURAL</b>																			
Irrigation Hardware	0.0	0.5	0.5	0.9	0.9	1.3	1.4	1.4	0.1	1.2	0.9	1.7	1.6	1.8	0.6	0.0	0.0	0.0	14.8
Irrigation Scheduling <sup>8</sup>	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.1	1.2	0.0	0.0	0.0	0.2	0.0
<b>AG. SUBTOTAL</b>	<b>0.0</b>	<b>0.5</b>	<b>0.5</b>	<b>0.9</b>	<b>0.9</b>	<b>1.3</b>	<b>1.4</b>	<b>1.4</b>	<b>0.1</b>	<b>1.2</b>	<b>0.9</b>	<b>1.7</b>	<b>1.6</b>	<b>1.8</b>	<b>0.6</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>14.8</b>
<b>MULTI-SECTOR</b>																			
Billing Credits	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.6	0.2	0.5	0.6	0.3	0.0	0.0	2.4
Competitive Acquisition	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.6	0.0	0.1	0.1	1.1	2.0
BPA Sys Efficiencies	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.0	0.0	0.0	0.0	0.7
Third-Party Financing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	10.3	12.4	18.1	6.8	4.8	57.3
Flex Agreements	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.3	10.6	9.4	6.0	7.5	41.8
<b>MULTI-S. SUBTOTAL</b>	<b>0.0</b>	<b>0.2</b>	<b>0.7</b>	<b>5.4</b>	<b>20.1</b>	<b>23.6</b>	<b>27.9</b>	<b>12.9</b>	<b>13.4</b>	<b>104.2</b>									
<b>SECTOR SUBTOTALS</b>	<b>32.5</b>	<b>70.8</b>	<b>17.5</b>	<b>18.0</b>	<b>23.0</b>	<b>15.2</b>	<b>11.7</b>	<b>13.0</b>	<b>7.0</b>	<b>13.2</b>	<b>26.5</b>	<b>47.4</b>	<b>41.4</b>	<b>52.8</b>	<b>42.7</b>	<b>40.0</b>	<b>20.6</b>	<b>14.7</b>	<b>508.1</b>
Con/Mod	0.0	0.0	0.0	0.0	0.0	2.5	37.6	30.9	24.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	95.9
<b>SUBTOTAL W/ CON/MOD</b>	<b>32.5</b>	<b>70.8</b>	<b>17.5</b>	<b>18.0</b>	<b>23.0</b>	<b>17.7</b>	<b>49.3</b>	<b>43.9</b>	<b>31.9</b>	<b>13.2</b>	<b>26.5</b>	<b>47.4</b>	<b>41.4</b>	<b>52.8</b>	<b>42.7</b>	<b>40.0</b>	<b>20.6</b>	<b>14.7</b>	<b>604.0</b>
<b>LOAD REDUCTION FROM BLDG. CODES</b>																			
Residential	0.0	0.0	0.0	0.4	2.1	2.6	3.5	6.2	5.3	5.2	10.4	12.8	10.5	10.3	8.7	8.8	8.2	8.2	103.2
Commercial	0.0	0.0	0.0	0.0	0.0	1.1	2.1	2.1	1.1	1.1	1.1	1.1	1.1	4.6	5.9	6.5	4.9	6.2	38.9
<b>Improved Bld Codes</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.4</b>	<b>2.1</b>	<b>3.7</b>	<b>5.6</b>	<b>8.3</b>	<b>6.4</b>	<b>6.3</b>	<b>11.5</b>	<b>13.9</b>	<b>11.6</b>	<b>14.9</b>	<b>14.6</b>	<b>15.3</b>	<b>13.1</b>	<b>14.4</b>	<b>142.1</b>
<b>Market Transformation <sup>9</sup></b>	<b>0.0</b>	<b>4.0</b>	<b>4.0</b>																
<b>TOTAL HISTORICAL CONSERVATION</b>																			
<b>CONSERVATION</b>	<b>32.5</b>	<b>70.8</b>	<b>17.5</b>	<b>18.4</b>	<b>25.1</b>	<b>21.4</b>	<b>54.9</b>	<b>52.2</b>	<b>38.3</b>	<b>19.5</b>	<b>38.0</b>	<b>61.3</b>	<b>53.0</b>	<b>67.7</b>	<b>57.3</b>	<b>55.3</b>	<b>33.7</b>	<b>33.1</b>	<b>750.1</b>

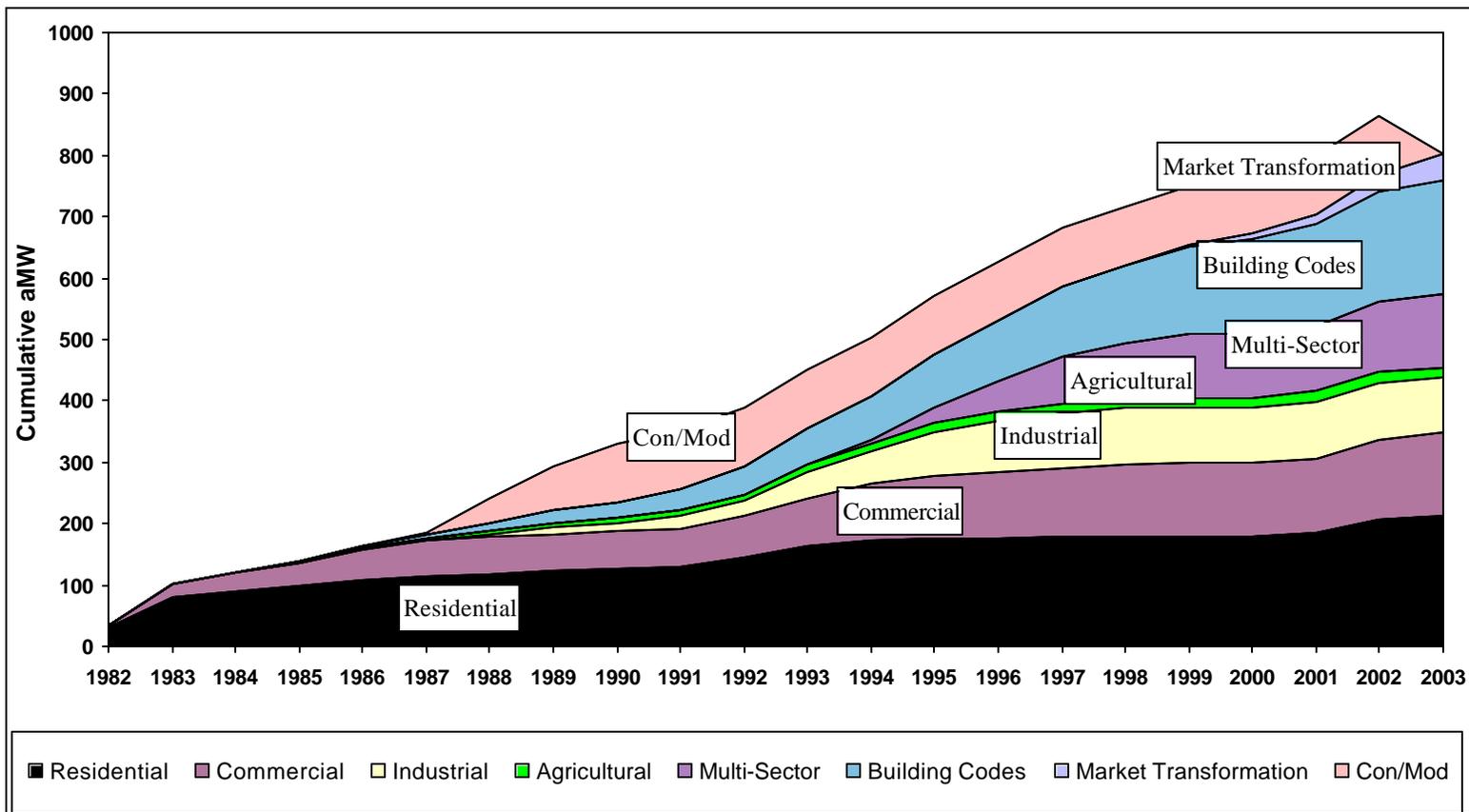
<sup>8</sup> Irrigation Scheduling represents one year savings only and are not accumulated in the total column.

<sup>9</sup> Market Transformation includes only BPA's share and not regional Market Transformation savings.

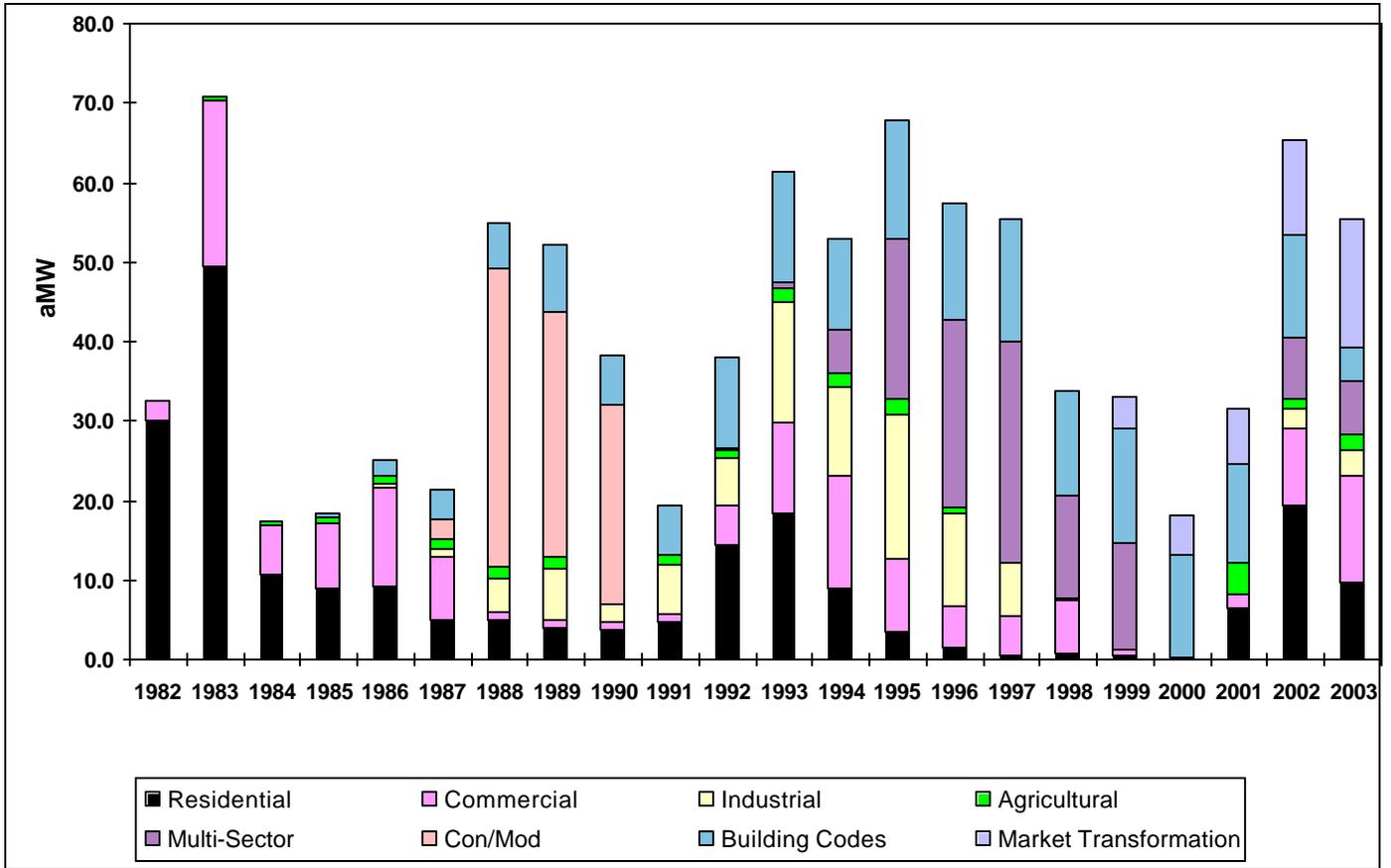
**BPA's Conservation Savings from Acquisition Programs,  
FY 1982 - 2003  
(See Figures 2 & 3)**

Figure 2 presents a cumulative graphic comparison of BPA's historical direct acquisition program by year by sector. Figure 3 shows the annual acquisition in each of these sectors.

**FIGURE 2**  
**BPA's Historical Conservation Savings**  
**FY 1982 – 2003**  
**Adjusted Cumulative Savings (aMW)**



**FIGURE 3**  
**BPA's Historical Conservation Savings<sup>10</sup>**  
**FY 1982 - 2003**



<sup>10</sup> Multi-Sector includes billing credits, BPA system efficiencies, and other cross-sector programs

# **CONSERVATION COSTS**

## **Total BPA Conservation Costs (See Table C)**

### TABLE C

BPA spent approximately \$2.1 billion on conservation efforts from FY 1982 - 2003. Acquisition expenditures have been: residential, \$1.1 billion; commercial, \$382 million; industrial, \$117 million; ConMod of aluminum smelters, \$48 million; agricultural, \$30 million; and multi-sector acquisitions, \$174 million. Miscellaneous costs make up an additional \$234 million.

### **NOTES ON TABLE C:**

The costs in this table are "accrued" expenditures -- the amount actually invoiced in a given year. The expenditures reported have been "loaded" to include all direct costs (measure costs, installation, administrative, and program evaluation costs) related to conservation, indirect costs associated with BPA's Energy Efficiency Program (load forecasting, planning, and economic analysis), and a share of other corporate overhead. The costs reported in this table do not include interest expense on conservation borrowing.

BPA's historical conservation costs have not always been reported consistently from year to year. Prior to 1988, costs were allocated to specific sectors and to resource planning. Starting in 1988, some resource planning costs were allocated to specific sectors. In addition, two new cost categories were created: multi-sector acquisitions, and miscellaneous costs. Although this change in categories makes it difficult to do a year-by-year comparison of sector costs, the change more accurately reflects expenditures. Multi-sector Acquisitions cover more than one sector and include costs for billing credits, competitive acquisitions, and financial and technical assistance programs. Miscellaneous costs are non-sector specific and consist of resource planning costs through FY 1987, Research Development & Demonstration, prior year adjustments, community education programs, Market Transformation costs, C&RD administrative payments to utilities, and environmental costs relating to conservation. No costs were broken out to the miscellaneous category for FY 1994, 1995 or 1997. The miscellaneous costs shown in FY 1996 are costs related to the new Energy Efficiency organization. In FY 1995, BPA was reorganized and also implemented a new accounting system. This resulted in some changes in how costs were accounted for and reported. Every attempt was made to allocate the appropriate costs to the correct categories as accurately as possible.

### **SPECIAL NOTE:**

To get an estimate of per-unit conservation costs, it is tempting to divide the dollars in Table C by the energy savings in Tables A, B1 or B2. This would supposedly yield an "average cost per megawatt". While this may seem useful, BPA generally considers this to be an inappropriate way to measure resource costs. First, this method of estimation does not take into consideration the varying lifetimes and characteristics of energy resources. For example, 1 aMW of energy savings from a new residential building code program having an expected lifetime of 70 years cannot be equated with 1 aMW of savings from a program having a much shorter life.

Secondly, the simple division method is inappropriate because:

Some savings were achieved in Pay for Performance or Competitive Acquisition contracts. These savings are reported as first year savings while the cost is paid from year-to-year expense budgets over a number of years.

Most savings were paid for from the capital budget and costs were amortized through federal borrowing. Our cost for these projects shows up as the capital cost and not the year-to-year amortization payments. The way we treat savings, therefore, is consistent year-to-year while the costs are a mixture of predominantly capital with a substantial expense component.

Our cost table makes no distinction between capital and expense payments. This means not all year-to-year costs can be directly compared to any single year savings reported.

**Table C**  
**Total BPA Energy Conservation Costs in**  
**Loaded Nominal Dollars (000's) <sup>11</sup>**

Fiscal						Multi-		Total	Total
Year	Residential	Commercial	Industrial	Con/Mod	Agricultural	Sector	Misc.	Incremental	Cumulative
						Acq.	Costs <sup>2/</sup>	Costs	Costs
1982	\$50,346	\$11,247	\$0	\$0	\$0	\$0	\$5,321	\$66,914	\$66,914
1983	\$162,114	\$39,892	\$1,409	\$0	\$895	\$0	\$2,689	\$206,999	\$273,913
1984	\$57,374	\$8,656	\$513	\$0	\$1,309	\$0	\$7,242	\$75,094	\$349,007
1985	\$77,907	\$26,553	\$957	\$0	\$2,098	\$0	\$20,232	\$127,747	\$476,754
1986	\$79,898	\$13,007	\$1,013	\$0	\$3,546	\$0	\$7,458	\$104,922	\$581,676
1987	\$60,651	\$7,546	\$2,233	\$0	\$1,918	\$0	\$11,008	\$83,356	\$665,032
1988	\$40,979	\$14,144	\$3,297	\$1,881	\$2,166	\$3,950	\$8,483	\$74,900	\$739,932
1989	\$37,269	\$15,467	\$5,889	\$4,726	\$1,428	\$3,000	\$5,479	\$73,258	\$813,190
1990	\$40,016	\$18,062	\$5,681	\$6,063	\$1,428	\$3,232	\$3,515	\$77,997	\$891,187
1991	\$49,808	\$19,554	\$6,181	\$6,254	\$3,257	\$2,959	\$3,495	\$91,508	\$982,695
1992	\$80,949	\$25,334	\$8,397	\$4,553	\$2,593	\$6,673	\$4,134	\$132,633	\$1,115,328
1993	\$89,241	\$32,485	\$13,899	\$4,179	\$2,187	\$7,944	\$1,977	\$151,912	\$1,267,240
1994	\$77,726	\$45,764	\$22,383	\$6,462	\$2,617	\$17,133	\$0	\$172,085	\$1,439,325
1995	\$49,783	\$23,061	\$17,346	\$4,045	\$1,712	\$26,676	\$0	\$122,623	\$1,561,948
1996	\$29,071	\$13,540	\$9,839	\$4,595	\$1,227	\$34,330	\$3,033	\$95,635	\$1,657,583
1997	\$11,316	\$7,770	\$3,988	\$2,744	\$338	\$16,373	\$0	\$42,529	\$1,700,112
1998	\$5,944	\$10,495	\$3,674	\$2,358	\$173	\$12,857	\$2,136	\$37,637	\$1,737,749
1999	\$4,093	\$5,888	\$1,902	\$280	\$49	\$20,438	\$9,049	\$41,699	\$1,779,448
2000	\$2,486	\$85	\$0	\$0	\$5	\$0	\$39,901	\$4,2477	\$1,821,925
2001	\$11,500	\$993	\$327	\$0	\$875	\$2	\$35,847	\$49,845	\$1,871,770
2002	\$33,060	\$23,483	\$3,345	\$0	\$395	\$402	\$45,657	\$106,342	\$1,978,112
2003	\$24,438	\$19,427	\$5,114	\$0	\$597	\$18,440	\$47,024	\$115,040	\$2,093,152
<b>Total</b>	<b>\$1,076,270</b>	<b>\$382,453</b>	<b>\$117,387</b>	<b>\$48,140</b>	<b>\$30,813</b>	<b>\$174,409</b>	<b>\$263,680</b>	<b>\$2,093,152</b>	<b>\$2,093,152</b>

<sup>11</sup>Loaded costs include all direct costs related to these activities, indirect costs, and corporate overhead.

**Table C (continued)**  
**Total BPA Energy Conservation Costs in**  
**Loaded Nominal Dollars (000's)**

<b>COSTS ASSOCIATED W/CONAUG, C&amp;RD, MARKET TRANSFORMATION, LEGACY CARRYOVER AND NEW INITIATIVES</b>								
	ConAug	C&RD Measures	C&RD RD&D Projects	C&RD Donations	C&RD Admin	Market Transformation	Legacy	New Initiatives
2000	\$0	\$0	\$0	\$0	\$0	\$11,500	\$2,576	\$0
2001	\$3,687	\$6,340	\$0	\$1,017	\$0	\$9,500	\$3,001	\$0
2002	\$28,155	\$26,825	\$68	\$3,401	\$4,587	\$7,600	\$2,436	\$0
2003	\$22,956	\$24,311	\$35	\$4,250	\$4,875	\$9,600	\$3,720	\$92

**FORECASTED  
LOAD REDUCTION FROM  
IMPROVED BUILDING CODES**

**Forecasted Load Reduction  
From Improved Building Codes, FY 1999 - 2003  
(See Table D)**

Table D has been deleted in this edition of the RED Book due to its speculative nature. Future editions of the RED Book will not include Table D.

# **APPENDIX A**

## **ADJUSTMENT TABLE**

BPA'S HISTORICAL CONSERVATION SAVINGS BY PROGRAM (POST LEGACY) (FY 2000 – 2003)

## APPENDIX A

Table B1A reflects the various adjustments by Fiscal Year made to both the ConAug and C&RD Programs. **One example is the devaluation of the Residential Compact Fluorescent Lighting Program.**

Some corrections were based on utilities submitting corrected reports on both the C&RD Program and corrections for the ConAug Program.

**Other adjustments were made to third party contracts when the final reports were submitted and verified appropriately.**

A couple of the Utility contracts are complex and required adjustments after their quarterly reports were submitted and entered into the EE dBase.

**The Irrigation Scheduling Program only has a one-year life, therefore adjustment is necessary so that the savings are not counted as Total Savings.**

**TABLE B1A  
Adjustment Table  
BPA's HISTORICAL CONSERVATION SAVINGS  
BY PROGRAM (POST LEGACY) (FY 2000 - 2003)  
Incremental aMW As of February 17, 2004**

	FY 2000	FY 2001	FY 2002	FY 2003	TOTAL FY 00-03
<b>RESIDENTIAL</b>					
Low Income Residential Weatherization (States)	0.0	0.0	0.0	0.0	0.0
<i>Conservation Augmentation (ConAug)</i>					
CFL Program	0.0	0.0	(0.6)	(1.5)	(2.1)
Invitation to Reduce Load through Conservation (IRLC)	0.0	0.0	0.1	0.0	0.1
<b>TOTAL RESIDENTIAL CONAUG</b>	<b>0.0</b>	<b>0.0</b>	<b>(0.5)</b>	<b>(1.5)</b>	<b>(2.0)</b>
Conservation Renewable Discount (C&RD)	0.0	(0.1)	0.7	0.0	0.6
<b>RESIDENTIAL TOTAL</b>	<b>0.0</b>	<b>(0.1)</b>	<b>0.2</b>	<b>(1.5)</b>	<b>(1.4)</b>
<b>COMMERCIAL</b>					
<i>Conservation Augmentation</i>					
Federal	0.0	0.0	0.0	0.0	0.0
Lighting Std Offer & Ex panded Std Offer	0.0	0.0	0.0	0.0	0.0
Vending Miser	0.0	0.0	(0.1)	0.0	(0.1)
Commercial & Industrial	0.0	0.0	0.2	0.0	0.2
Invitation to Reduce Load through Conservation (IRLC)	0.0	0.1	0.2	0.0	0.3
<b>TOTAL COMMERCIAL CONAUG</b>	<b>0.0</b>	<b>0.1</b>	<b>0.3</b>	<b>0.0</b>	<b>0.4</b>
<i>Conservation Renewable Discount (C&amp;RD)</i>	<i>0.0</i>	<i>0.2</i>	<i>0.0</i>	<i>0.0</i>	<i>0.2</i>
<i>Federal Reimbursable</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>
<i>New Initiatives - Institutional Program</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>
<b>COMMERCIAL TOTAL</b>	<b>0.0</b>	<b>0.3</b>	<b>0.3</b>	<b>0.0</b>	<b>0.6</b>
<b>INDUSTRIAL</b>					
<i>Conservation Augmentation</i>					
Water/Wastewater	0.0	0.0	0.0	0.0	0.0
Invitation to Reduce Load through Conservation (IRLC)	0.0	0.0	(0.4)	0.0	(0.4)
<b>SUBTOTAL INDUSTRIAL CONAUG</b>	<b>0.0</b>	<b>0.0</b>	<b>(0.4)</b>	<b>0.0</b>	<b>(0.4)</b>
Conservation Renewable Discount (C&RD)	0.0	0.4	(0.2)	0.0	0.2
<b>INDUSTRIAL SUBTOTAL</b>	<b>0.0</b>	<b>0.4</b>	<b>(0.6)</b>	<b>0.0</b>	<b>(0.2)</b>
<b>Agricultural</b>					
Conservation Augmentation	0.0	0.0	0.0	0.0	0.0
Conservation Renewable Discount (C&RD)	0.0	(3.7)	(0.9)	(1.6)	(6.2)
<b>AGRICULTURAL TOTAL</b>	<b>0.0</b>	<b>(3.7)</b>	<b>(0.9)</b>	<b>(1.6)</b>	<b>(6.2)</b>
<b>Multi-Sector</b>					
Conservation Augmentation	0.0	0.0	(0.2)	0.0	(0.2)
Conservation Renewable Discount (C&RD)	0.0	0.0	0.0	0.0	0.0
<b>MULTI-SECTOR SUBTOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>(0.2)</b>	<b>0.0</b>	<b>(0.2)</b>
<b>TOTAL CONSERVATION AUGMENTATION</b>	<b>0.0</b>	<b>0.1</b>	<b>(0.8)</b>	<b>(1.5)</b>	<b>(2.2)</b>
<b>TOTAL CONSERVATION RENEWABLE DISCOUNT (C&amp;RD)</b>	<b>0.0</b>	<b>(3.2)</b>	<b>(0.4)</b>	<b>(1.6)</b>	<b>(5.2)</b>
<b>BUILDING CODES</b>					
Residential	0.0	0.0	0.0	0.0	0.0
Commercial	0.0	0.0	0.0	0.0	0.0
<b>BUILDING CODES TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
<b>Market Transformation</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
<b>TOTAL POST LEGACY CONSERVATION</b>	<b>0.0</b>	<b>(3.1)</b>	<b>(1.2)</b>	<b>(3.1)</b>	<b>(7.4)</b>

**Bonneville Power Administration**

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**DOE/BP-3332 February 2003 2C**

